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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,135	12/03/2003	Vencent Chang	JCLA12578	6798

23900 7590 08/23/2007

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EXAMINER	
CHACKO DAVIS, DABORAH	
ART UNIT	**PAPER NUMBER**
1756	
MAIL DATE	**DELIVERY MODE**
08/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/728,135	CHANG ET AL.	
	Examiner	Art Unit	
	Daborah Chacko-Davis	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6-8 and 10-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-4,6-8,10-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 12, 2007, has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1,3-4, 6-8, 10-15, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,939,664 (Huang et al., hereinafter referred to as Huang) in view of U. S. Patent No. 5,282,066 (Yu et al., hereinafter referred to as Yu).

Huang, in the abstract, in col 1, lines 65-67, in col 2, lines 1-4, in col 5, lines 11-19, in col 8, lines 56-67, in col 9, lines 35-50, in col 10, lines 22-67, in col 11, lines 1-60, discloses an immersion lithographic process comprising providing an imaging resist layer (the imaging resist layer is also an acid-generating resist layer i.e., an acid material is present, and is considered the same as the acid supplying layer) that is coated onto a first layer of underlying planarizing layer or a multilayer (the underlying

planarizing layer is disclosed as an acid generating resist layer in US 2002/0058204 cited in col 11, lines 50-54 of Huang, and hence considered as the resist layer) and coated on a wafer (material layer), performing exposure on the multilayered substrate forming exposed and unexposed portions of the imaging resist, wherein the exposed resist layer undergoes acid-catalyzed reaction (acid generated from the resist layer upon exposure) resulting in the solubilization of the exposed portion of the photoresist layer, developing the exposed imaging layer so as to remove the exposed portions of the imaging layer and the corresponding underlayers, wherein the remaining non-soluble portions of the top imaging layer function as a mask structure for further processing. Huang, in col 11, lines 1-10, discloses that the exposed imaging layer is baked to promote acid-catalyzing reactions (solubilizing step) prior to the development i.e., the exposed portions of the imaging layer is altered in its polarity due to acid-catalyzed reactions (claims 1, 7, and 11-12,14-15). Huang, in col 4, lines 55-67, in col 5, lines 1-10, in col 8, lines 25-40, discloses that the acid is generated in the exposed portions of the photoresist (positive resist compositions) alters the polarity of the exposed portion of the photoresist (acid-catalyzed reactions in the exposed portions of the photoresist) and correspondingly alters the polarity of the imaging layer (protective layer), resulting in soluble (hydrophilic) and insoluble (hydrophobic) portions in the imaging and underlying layers, wherein the soluble portions are removed in the developing step (claims 3-4, 8). Huang in col 14, lines 49-53, discloses forming the photoresist layer on an ARC (anti-reflection layer) coated wafer (claims 6, 10, and 13).

The difference between the claims and Huang is that Huang does not disclose forming a protective layer on the resist layer and/or the acid supplying layer. Huang does not disclose that the acid produced in the imaging resist layer is diffused in the protective layer.

Yu, in col 6, lines 15-20, discloses that a protective layer is formed on the photoresist layer.

Therefore, it would be obvious to a skilled artisan to modify Huang by employing a protective layer on the imaging resist layer because Yu, in col 6, lines 12-26, discloses that the protective layer on the photosensitive layer (imaging resist layer) prevents the immersion oils or liquids from contacting or interacting with the imaging resist layer, and it would be obvious to a skilled artisan to solubilize the protective layer suggested by Yu after exposure because Huang, in col 9, lines 52-67, and in col 10, lines 1-6, discloses that the imaging resist layer is an acid generating layer, which upon exposure releases acid in the exposed regions and is subjected to post-exposure heating, as a result of which the thermal energy supplied makes the released acid mobile and interactive to its vicinities and promotes acid-catalyzed reactions i.e., will solubilize any layer (underlying or topcoat protective) in the exposed portions.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 16-17, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,939,664 (Huang et al., hereinafter referred to as Huang) in view of U. S. Patent No. 5,282,066 (Yu et al., hereinafter referred to as Yu) as applied to claims 1,3-4, 6-8, 10-15, and further in view of EP 1152036 (Kanda et al., hereinafter referred to as Kanda).

Huang in view of Yu is discussed in paragraph no. 3.

The difference between the claims and Huang in view of Yu is that Huang in view of Yu does not disclose that the polarity of the protective layer is the same as that of the exposed portion of the photoresist after the baking step (claims 16-17).

Kanda, in [0009], [0023], [0024], discloses that upon exposure followed by baking (heat-treatment) of the coating material (protective layer) coated on the resist pattern, the acid is diffused into the coating material in the exposed regions thereof, and thus the polarity of the coating material corresponding to that of the underlying resist pattern is the same.

Therefore, it would be obvious to a skilled artisan to modify Huang in view of Yu to have a protective layer that has the same polarity as that of the underlying exposed resist because Yu, in col 6, lines 23-25, teaches that the protective layer is a water soluble polymer that includes polyvinyl alcohol, and in col 7, lines 34-35, discloses that the protective layer can remain on the photosensitive layer (i.e., after imaging, and in subsequent processes), and Kanda teaches that the coating material layer (protective layer) is a water soluble resin that comprises polyvinyl alcohol and that the coating material layer undergoes acid permeation and diffusion in the region, that corresponds

to the underlying exposed resist regions, and Huang teaches that after the immersion exposure, a heating step is performed that promotes acid-catalysed reactions solubilizing any layer (top or bottom) in the exposed portions.

Response to Arguments

6. Applicant's arguments filed June 12, 2007, have been fully considered but they are not persuasive. The 103 rejection made in the previous office action (paper no. 20070209) has been maintained.

A) Applicants argue that Huang does not disclose forming a protective layer on the resist layer.

Huang is not depended upon to disclose the formation of a protective layer on the acid supplying layer. Yu teaches forming a protective layer on a photoresist or an acid-supplying layer.

B) Applicants argue that Huang does not disclose an acid supplying layer.

Huang in col 10, lines 54-67, in col 11, lines 1-15, teaches forming a photoresist layer on a planarizing underlayer, wherein the photoresist layer has an acid generator and is considered the same as the acid supplying layer. Huang in col 11, lines 21-55, teaches a planarizing underlayer under the photoresist layer (considered here as the acid supplying layer) wherein the planarizing underlayer layer is a photosensitive polymer and is considered here as the photoresist layer and (also taught in detail in US2002 /0058204 incorporated in Huang in col 11, lines 52-54) is a radiation sensitive and acid generating resist layer. Therefore, Huang does teach an acid supplying layer.

C) Applicants argue that the protective layer of the Yu reference is different from the protective layer of the claimed invention.

Yu teaches forming a protective layer on the photosensitive recording layer (i.e., photoresist layer) so as to perform immersion lithography on the photosensitive layer to prevent interaction of the index matching immersion medium with the photosensitive film (preventing immersion liquid diffusion i.e., to protect the photosensitive layer). The claim recites an immersion exposure process performed on a photoresist layer wherein a protective layer is formed on the photoresist layer.

D) Applicants argue that Yu teaches immersing the photosensitive film in oil, and that the present invention teaches immersion in DI water.

The claims recite an immersion lithography process. Yu teaches that the photosensitive film can be exposed in an immersion medium i.e., perform immersion lithography on the photosensitive layer. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., immersion lithography process performed on a photoresist layer by immersion in deionized (DI) water) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

E) Applicants argue that neither Huang nor Yu teaches the limitations of claims 16-17.

See paragraph no. 5.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

August 20, 2007.